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*Patio Cactus Garden
of Mr. and Mrs. W. P. Herbert*



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Such a host of names of succulent plants are followed by the letters N.E.Br., that Mr. N. E. Brown of Kew will hardly need an introduction to our readers. He has published continuously since the seventies of the last century; today, at the venerable age of 80, he is as active as ever. So well known is Mr. Brown, that we have even seen his name coined into neologism, the adjective nebrownishly. Mr. Brown is the only person alive to have seen the remains of the unparalleled collection of the great Haworth with his own eyes. We are sure that our readers will look forward expectantly to the contributions from his pen to these columns.

J. W.

6 The Avenue, Kew, England,
August 21, 1929.

THE EDITOR, Cactus Journal.

Dear Sir:

Having received from Mr. J. West a copy of the first number of the Cactus Journal (your full title is too long to write), may I offer you my hearty congratulations upon the launching of this new venture, which I hope will meet with every success that such a paper can achieve. This first number is interesting and I hope will be followed by others giving to English readers information about succulent plants in a language that they can understand, for at present there is no general periodical dealing with this group of plants in the English language.

It is now over sixty years ago that I first made my acquaintance with succulent plants and I have been fascinated by them ever since; my chief interest being in the African members of the group, for it is with species of that region that I am best acquainted, and this brings me to that which I wish to write about, which is to enter a protest against the remark by Dr. Houghton on page 15, Vol. 1, No. 1, under the paragraph about Aizoaceae, which credits Mrs. Bolus with having divided *Mesembryanthemum* "into many other genera, but which we have not yet made up our minds to follow." Now, sir, as this is an erroneous statement of the facts, may I ask you to refer to the "Gardeners' Chronicle," 1925, Vol. 78, pages 211, 232, 272, 412 and

433, where you will find that it is the writer of this letter who is responsible for the division of the old genus *Mesembryanthemum* into new genera, and you will find a full account of the reason for the division and the method I adopted to divide the old genus into many new and well defined genera, of which a key is given on the two last mentioned pages, full descriptions being given in the subsequent monographic account. And in Vol. 70 (1921) you will find details of their remarkable structural and biological peculiarities. Mrs. Bolus, apart from adding a few new genera, has merely adopted my genera without quoting the author or place of publication, and so has made it appear to the uninitiated that they were genera she herself was establishing.

With reference to these very remarkable plants, it would seem that they are very little known in America. Why is this? For this group includes (apart from Insectivorous Plants) the most remarkable plants in existence in their appearance and biological characteristics. No other group is comparable with them. For in no other group do you find plants provided with windows for regulating the action of light, nor plants that change their skin once a year, or that mimic their surroundings so perfectly as these plants do. In what other plant than the extraordinary *Mitria hortenseae* (see Gard. Chron., Vol. 81, pp. 116, 251) are there cells that when isolated after the succulent tissue surrounding them has dried up will endure for several days fully exposed to the air and dust of an ordinary living room without drying up? It is these numerous peculiarities that make these plants so fascinating to cultivate and study. Also they have these advantages over most plants: many of the more interesting can be grown in very small pots and so take up little room. They are not very liable to be attacked by insects. Thrips and mites seem to be the only insects that attack them, and a large number are never attacked by any insect. So that it becomes a matter to wonder at that they seem to be so little known in the United States. Yours very truly,

N. E. BROWN.

CEPHALOCEREUS SENILIS (Haworth) Pfeiffer

By WILLIAM HERTRICH

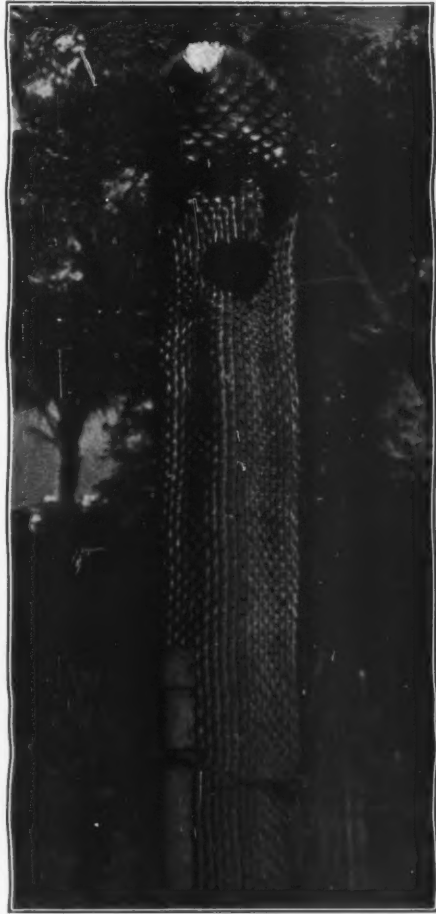
Since *Cephalocereus senilis* (commonly called "Old Man Cactus") is known to and desired, perhaps, by more cactus collectors both professional and amateurs alike, than most other species, a few words about its popularity, nativity and behavior under ordinary care, would be appropriate at this time, to the many readers of the *Cactus Journal*.

The popular name, "Old Man Cactus" has been applied on account of the long white hair appearing on the plant, and very pronounced on its head. Therefore, the Mexican name of *Cabesa de viejo*, and the German name, *Griesehaupt*, meaning the head of an old man. *Cephalocereus senilis* was first described as *Cactus senilis* in 1824 and since that time has been a very much desired plant in collections.

Its native habitat is in Mexico, found mostly in the states of Hidalgo and Guanajuato, along the steep slopes and canyons, amongst rock formations of lime and slate. Specimens are found sometimes to a height of from 30 to 40 feet, very seldom branching much above ground, however, very freely branching at base in older specimens. Invariably these branches, after straightening out, grow up parallel with the main stem.

Very large plants are seldom seen in cultivation. The Huntington Botanical Garden is fortunate to possess several specimens from 12 to 14 feet in height, producing for the first time this year the pseudocephalum out of which the flowers make their appearance. I am not aware of any other plants of this species ever blooming in this country under cultivation before. Large specimens were exported in 1890 for exhibition purposes at the Paris World's Fair. Other good size specimens found their way from time to time to the Berlin Botanic Garden. The specimens which flowered at the Huntington Botanic Garden for the first time this year were planted in 1909 as very small plants, at a time when numerous other desert plants collected by the writer in Mexico made the first nucleus of the now large xerophytic collection at San Marino.

The accompanying photo shows the flowers of *Cephalocereus senilis* taken at the Huntington Botanic Garden in San Marino, July 28, 1929. The dark patch below the head of the plant is an asphalt composition which was used to block the opening in the plant made by woodpeckers. It appears, at least in this case, that just about the time the pseudocephalum forms at the top of the plant, the stem directly beneath becomes



CEPHALOCEREUS SENILIS

The only plant of this species known to have bloomed in the United States. This plant is about thirteen feet high and more than twenty years old.

slightly hollow. The woodpecker soon discovers this and begins his destructive work.

Cephalocereus senilis is comparatively easy to grow, with what I should call ordinary cactus care. I have tried it out in light as well as heavy soil, with equal results, providing the drainage is good. If planted in rich soil, the trunk attains a larger diameter than it otherwise would, but produces fewer and shorter hairs. This species,

however, is somewhat sensitive to cold—if the cold weather should set in while the plant is in growing condition. Several fine specimens at the Huntington Botanic Garden suffered severely in 1913, 1922 and 1924. As importations into the United States of all types of plants are restricted under the Quarantine Act, and have been for a

number of years, it has been evident for some time that the demand is greater than the supply, which is one reason why good specimens are seldom to be had in the open market. The importation of seeds and small plants for propagation purposes is, at the present time, the only source of replenishing the depleted market.

TWO ASCLEPIADS

By JAMES WEST

If one were looking for a bridal bouquet for His Infernal Majesty, no more fitting flowers could be found than those of the succulent Asclepiads. Suggestive of unnamable things, with the scent of corruption about them, their marriage-bed a haven for carrion-flies; if any flowers have something satanic about them it is they. In spite, or perhaps because of that, they possess a peculiar and unholy attraction.

All this is perhaps more true of the Stapelias proper than of the genera we are introducing today, nevertheless all the tribe are among the most interesting of plants, and will well repay close study.

The structure of the flower in Asclepiadaceae, the Milkweed Family, to which the Stapelieae belong, is most intricate and not very easy to describe; they should really be studied with an actual flower in hand, under a good magnifying glass.

The reproductive parts are much more complicated than in the usual simple anther-and-pistil arrangement. Besides the calyx and corolla they possess generally two additional whorls, called the outer and inner corona, which together with pistil and anthers form what is called the gynostegium or sexual column. The coronas are very variously shaped in the different genera and species, the outer being sometimes, as in the present example of *Heurnia*, more or less disk-shaped and lying flat on the base of the corolla, or else divided into five longer or shorter segments or appendages. The inner corona, inside and above the outer, generally consists of five appendages of extreme variability in the different species. It may be furnished with horns, as in most of the Stapelias, or with various other out-growths, and surrounds the cylinder-like body formed by the connate anthers. In the accompanying illustration of *Heurnia penzigii* the star-like object discernable at the center of the flower represents the upper halves of the inner corona-segments, which in this case are bent over at an angle to come together at the top—somewhat in the manner of the rafters of a pentagonal roof sheltering the staminal column

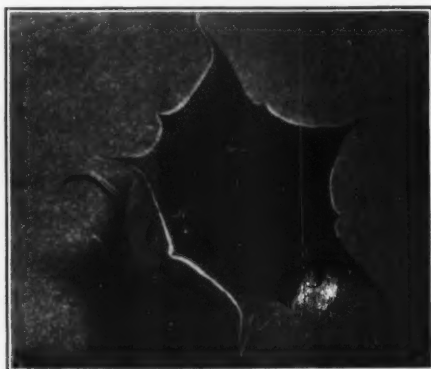


Photo by J. West

Flower of *Heurnia penzigii* N.E.Br. (detached). x 3.

below. The anthers themselves are only visible after dissection, lying under the inner corona and connate with the disk-shaped body formed by the stigma, whose real stigmatic surfaces, however, are hidden below this disk in the shape of narrow fissures between each pair of anthers. The pollen of the anthers is contained in very peculiar bodies, the pollinia. These are pairs of elongated masses of pollen-grains, connected at one end and furnished at their junction with a small body having a narrow slit. The purpose of the whole structure is to facilitate fertilization by insects, in our case usually flies. For the pollinia are easily detachable as a whole, the visiting insect's tongue getting caught in the just mentioned slit, and the fly so being forced to carry away the entire structure until it is able to strip it off on the stigma of another flower. A similar arrangement exists in the flowers of the Orchids.

The structure of the corona is very important for the identification of genus and species in the Stapelieae.

Heurnia penzigii is among the very few species of the genus in cultivation with us, but even so not at all a common plant. The genus *Heurnia*, named after Justus van Heurn, or Heurnius, one of the earliest Dutch plant-collectors at the Cape

of Good Hope, with more than 30 species, is separated from *Stapelia* principally by the outer corona being adnate to the corolla-base and by an additional smaller tip between each pair of the five principal segments of the corolla, thus making the flower more or less 10-parted. This may be easily seen in our photograph. The corolla is always campanulate, at least at the base. The stems are somewhat similar to *Stapelia*, but generally with longer teeth, and always glabrous.

The genus ranges from the Cape through East Africa and Abyssinia to Arabia.

Heurnia penzigii (after O. Penzig, an Italian botanist) belongs to the section *Plagiostelma*. It is native in Abyssinia and Eritrea. The stems are about three to four inches high, smooth, bright green or marked with red in the sun, with from five to seven ribs, more or less irregular or wavy, rounded off at the angles and furnished with long slender soft teeth. The plants are strongly cespitose in the manner of most *Stapelias*.

The flowers are produced at the base of the stems, several from a common point of origin, opening successively. The small and slender buds develop into flowers about three-fourths inch in diameter, whose appearance is well shown in the photograph. The color is a very deep velvety purple-red, almost black, slightly lighter at the center. The corona, especially the outer, is very dark. The inside of the flower is very papillose, the outside whitish. The calyxlobes are very slender.

The plant is quite easy of cultivation, a handsome object in or out of flower, and deserves to be more widely grown. There are many other *Heurnias*, very beautiful and interesting, and one would wish that more of them might be introduced into our collections.

Our second picture represents another genus of the *Stapelia* tribe, *Echidnopsis*. In this the flowers are small or even minute, the segments triangular-ovate, free or with a short tube, the corolla either erect-campanulate or rotate. The corona may be simple or double. The stems are very characteristic; while in *Stapelia* and *Heurnia* they branch only at the base in a more or less cespitose manner, each stem growing for a season to a certain height and then stopping, in this genus they make continuous growth in the manner of a *Cereus*, also are capable of branching at the upper part of the stem. Their texture is characteristic, being warty-papillose, hard and rough to the touch in contrast to the soft *Stapelias*. The ribs number from 6 to 10, and are divided by sharp furrows into hexagonal fields or humps. The flowers are borne near the top of the stems.

Our species, *E. cereiformis*, hails from Southern Arabia and across the Red Sea to Eritrea. The stems are 8-ribbed, erect or ascendent, more or less bent or twisted, up to a foot in length, irregularly branched. The young tubercles bear minute triangular leaves, later replaced by short teeth. The general appearance is not unlike that of some *Euphorbias*. The corona is simple, with-



Photo by J. West

Flowering plant of *Echidnopsis cereiformis* Hook. fil.
(Natural size)

out appendages and yellow in color. The corolla also is a dull yellow.

This species is sometimes labeled *E. dammaniana* in our collections, but erroneously, as the latter species, while similar in habit, has a rotate, not campanulate corolla, brown instead of yellowish, a double, not simple corona, dark brown and with ligulate appendages to the outer one.

While not in any sense a showy plant, it is interesting as another somewhat different representative of the *Asclepiadaceae*.

CLARK GARDENS

CACTUS

AND

SUCCULENTS

at entrance to Raymond Hotel

1250 SO. FAIR OAKS AVE.

PASADENA, CALIFORNIA

THE GENUS NOPALEA, Salm-Dyck

By DR. ARTHUR D. HOUGHTON

Nopal is the Mexican name for plants of this class.

So far we have shown how the Pereskias with their broad leaves and stalked fruits (the only genus having such stalks to their fruits) are followed by Pereskioopsis with sessile or sitting fruits and glochids. Pereskioopsis is followed by the strange new genus Quiabentia, a transition form between the broad leaved genera and the subulate leaved Opuntias, with glochids and sessile fruits. Then came Pterocactus, still more spiny, with depressed fruits and winged seeds. One of the most important points being that in Pereskioopsis and Quiabentia the leaves are still broad and flat, but in all others of the Opuntia tribe the leaves are subulate (awl-shaped) or cylindric. Don't make a mistake at this point. The big flat discs are not leaves but branches, the leaves are small things, frequently falling off and occurring on the joints at the areoles (spine-cushions). The two next genera after Pterocactus, that is, Nopalea and Tacinga, are easily identified owing to the fact that their stamens are much longer than their petals and are exerted (stick out beyond the half opened flowers). Nopalea can be told from Tacinga because in Nopalea the joints are flat and the petals are erect (that is they never open out) while in Tacinga the joints are terete (having no angles) and the petals are recurved (curled back).

Nopalea cochenillifera and my new species N. brittonii are the only spineless Nopaleas. N. cochenillifera forms a definite trunk which is terete (quite round) and the joints are erect and turgid (fat). The fruit and ovary are nearly globular with low diamond-shaped tubercles, its tubercles bearing many glochids; the joints are usually six or seven inches long, and as in all Nopaleas the bright red petals and sepals are erect, giving the appearance of a flower bud that has not yet

opened. Through the ends of these the stamens and pistil with its six to seven inch greenish stigma lobes are exerted (stick out).

N. brittonii sp. nov., has been in collections to my own knowledge for many years, mostly labeled O. coccinellifera. Its habit, instead of being erect, is sprawling, the trunk usually being flattened; joints two to three feet long, not turgid and inclined to curve on the flat; the ovary more elongated than in N. cochenillifera; leaves fewer, less persistent, and areoles two to three times as distant as in N. cochenillifera. A more formal publication of this species will follow later.

The rest of the Nopaleas are all spiny and are divided into two groups according to whether their spines are slender, needle-like, as in N. guatemalensis, N. lutea, and N. gaumeri, or with stouter, subulate (awl-shaped) spines as in N. aueri, N. dejecta, N. karwinskiana, and N. inaperta.

N. guatemalensis has a tree-like habit up to twenty-five feet high, branched sometimes nearly to the base, with bluish-green, ovate to oblong, seven inch long joints; the areoles are numerous with short white wool; spines five to eight, of unequal length, porrect (sticking out), white or rose-colored, up to one and one-half inches long; flower including ovary about two inches long; petals red; fruit about one inch long, clavate (club-shaped), with some tubercles, a deep navel at the top, glochids not prominent.

N. lutea can be distinguished from the former by its yellow to brown spines, and from N. gaumeri by its obovate to oblong joints which are twice as long and wide as those of N. gaumeri, where they are linear-oblong to oblong-lanceolate.

N. lutea is from Guatemala, Honduras and Nicaragua.



Nopalea cochenillifera

Nopalea brittonii variegata (Houghton)

Nopalea brittonii (Houghton)

N. gaumeri grows ten feet high near Sisal, Yucatan; it is much branched, small jointed. Being a variety from the coast, it is less robust than species from the interior, it blooms from February to June, and birds are very fond of its fruit; the joints are two to four inches long and one to two and one-half inches wide, rather thin; areoles are small, one-third to three-fourths inch apart; spines of unequal length up to one-third inch long, needle-like, four to twelve to an areole, and stamens one and one-half inches long; fruit red, darker inside, obovoid (egg-shaped, with the narrow end toward the plant); areoles of ovary numerous, with spines and yellow glochids; umbilicus (navel at the top) one-third inch deep.

N. auberi, the first of the group with stout spines, is from central and southern Mexico, and is found in gardens throughout the world; in nature it attains a height of thirty-five feet. There are usually one or two spines or none to an areole; the areoles bear tufts of brown glochids; the ovary is about one and one-half inches long, with low but very distinct tubercles, and a deep umbilicus, its areoles bearing many long brown glochids.

The glaucescent (having bluish hoary appearance) joints, and its areoles with one or two or no spines, distinguish it from *N. dejecta*, whose areoles bear two to four spines and whose joints are green.

THE OPUNTIA IN AUSTRALIA

Referring to Mr. Mortensen's letter in the September issue of the Journal, on the spread of the *Opuntia* in Australia, and particularly where he states that the introduction into Australia is problematical, it is the opinion of the writer that there is no doubt all this trouble is due to the propaganda spread abroad by the introduction here in the "Burbank" spineless Cactus.

Some ten years ago, when there were over eighty Australian ex-war soldiers sent to Berkeley for a year's study, it was my great privilege to meet them at the U. S. Plant Garden at Chico, where they saw the collection of *Opuntias* gotten together by Dr. David Griffiths at the request of the Department of Agriculture.

This collection finally contained 3000 varieties (not species) of *Opuntia*, and if memory serves, some came even from Patagonia. The study of the Cactus as a forage plant was made, and a bulletin issued by the Department, and it is interesting at this time to recall, from memory, the one paragraph that killed the spineless business, it was to this effect, "*Opuntias* must have

N. dejecta, from Panama; *N. karwinskiana*, from Mexico; *N. inaperta*, from Yucatan, all have green joints. *N. dejecta* and *N. karwinskiana* have two to four spines to an areole; *N. dejecta* has joints four to seven times as long as wide, while in *N. karwinskiana* they are only two to four times as wide; while in *N. inaperta*, the joints are strongly tuberculate, which means that the areoles are raised on little hills, each bearing four to twelve spines. *N. inaperta* is one of the handsomest of the *Nopaleas*. It grows as high as thirty feet and makes a showy regular specimen.

All *Nopaleas* can be grown readily from cuttings.

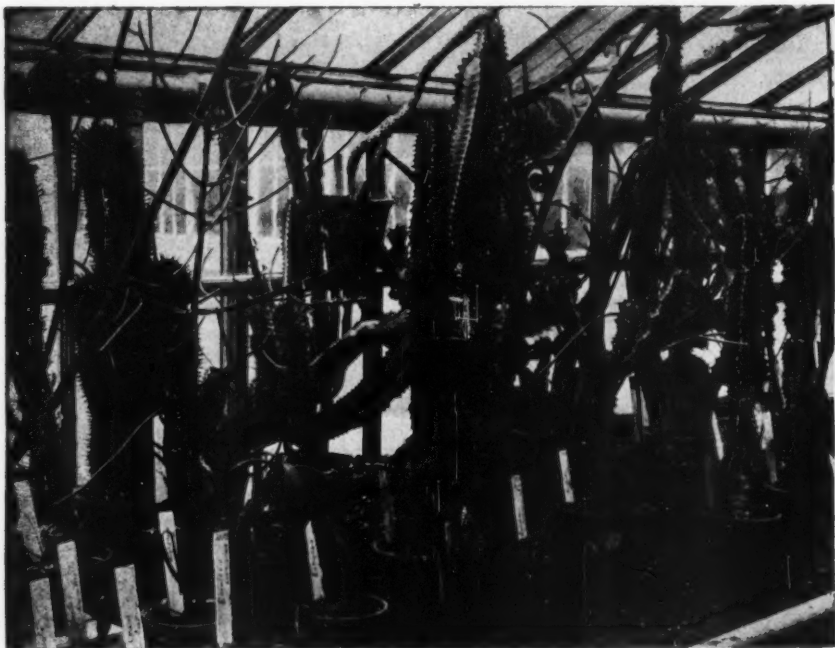
N. cochenillifera and some of the *Opuntias* have been grown from time immemorial by the aborigines of the American continent for the production of cochineal; such orchards or plantations were called *Nopalries*. The plants were infested with a scale insect called *Coccus cacti*; the impregnated female of this insect yields a fine scarlet-red dye. At the time of the conquest of Mexico, the Spaniards found whole towns thriving upon *Nopalries*. The plants and insects were taken to Spain and later to the Canary and other islands. From the Canaries about 1868 England imported the most of six million pounds of cochineal valued at four million dollars. The discovery of the anilin dyes which were cheaper and more permanent than cochineal practically wiped out the industry.

moisture, and where this abounds, more profitable forage crops may be grown. Many of the species figured in Britton & Rose are garnered from the great collection made by Dr. Griffiths."

A word should be said of what the soldiers' opinion was of the *Opuntia*, except that it could hardly be put in print in our Journal. The introduction, however, was distinctly traced by them to the Burbank "spineless." It was supposed that the Cochineal insect had been sent to Australia to combat the *Opuntia*. This agent was fatal to the collection at Chico as it was impossible to combat even with gasoline torches. One soldier remarked, that if the Cacti were dug and flung on the fences in Queensland their roots would go down and get a foothold and go on growing merrily.

One day, when Dr. Griffiths was about to leave for Washington, he passed to the writer about fifty packets of *Opuntia* seeds under number with the request that these be sown. Nearly all these germinated readily, and on his return in spring, he found that all were spiny, so orders were given to dump them. We then learned this

Continued on page 98



Euphorbias in the Edinburg Botanic Garden.

EUPHORBIA

By G. A. FRICK

There are about fifty cactus appearing Euphorbias available among dealers and collectors in the United States suitable for cuttings, which is the most desirable method of propagation and should never be undertaken except from May to September. Root these cuttings in washed sand, with a liberal quantity of wood ashes worked in it. Keep moist but be sure it is not too wet and make certain of good drainage; cuttings until rooted, rot easily. Select a partially shaded spot or lath house in which to do your rooting, and allow time enough for a good growth of roots before transplanting into pots, or the garden, as a few weak roots growing on the cutting, arrests the growth for a long time when transplanted. These would have done far better had they been left in the rooting box for another month.

Any kind of soil will do for Euphorbias, but I have found they do best in a mixture of one-third each of sand, decomposed granite, and leaf mold, with a liberal handful of wood ashes to each portion thereof. Add a little slaked lime also, but be careful as this can be overdone.

Plunged pots outdoors in the summer are far the best as this avoids root disturbance in the fall, when it will be necessary to move plants indoors. If placed in a glasshouse, extreme caution should be taken to avoid rain drips, which will kill the plants. Euphorbias should be kept dryer in the winter, which is the dormant season, than in the growing months.

Propagation from seed is not to be recommended. It is slow and uncertain. Also seeds from rare species are not available, as importations from Africa seem a hopeless task, there being no one who makes Euphorbia seed gathering his business; you must have a friend in that country do it for you. E. O. Orpet, superintendent of parks at Santa Barbara, Calif., has had the greatest measure of success with both securing and raising Euphorbias from seeds, that has ever come to my notice. He is an eminent horticulturist, and has all the modern means for the propagation of these plants by seeds, yet even he is discouraged and prefers the cuttings.

We have been advised, and many collectors

still leave their *Euphorbia* cuttings dry in a shady location from a week to a month, so as to give the cut part of the slip time to heal and become calloused, this prevents rot when planted. I have done this myself for years and found it very successful. But this last summer I have adopted the plan which is called crutching; I have not lost a single cutting since adoption. This method of rooting is to tie a stick of wood, about the size of a lead pencil on the side of each cutting. Allow three to four inches of this stick to extend beyond the bottom of the slip, force the stick into the ground, allowing not over one-fourth inch of the stalk under the surface of the soil. The stick will hold the cutting erect, and not enough of the slip is covered with sand to promote rot. I find in this way, cuttings can be set out immediately after removal from the stock plant without danger of losing them. Keep the soil moist and in about six to eight weeks the cutting has rooted enough to stand on its own legs; at this time cut the string that holds the stick and remove the crutch. Thus you have an established plant in about the same amount of time the other method consumed in merely drying out the cutting.

Pick out a few days of warm weather to transfer the rooted cuttings from propagating trays to pots, or the permanent location in which you wish to have them grow. Root disturbance seems less harsh with *Euphorbias* when done in hot weather, I have never lost one plant since following this precaution, though acquiring this knowledge has cost me many valuable specimens.

In watering *Euphorbias* the leafy groups as *Synadenium* and *Tirucalli* like more moisture than the *Dactylanthus* and *Medusea* groups. Watering once or even twice a week in the summer months is sufficient for the latter, while a daily watering if drainage is good, will not be too much for the former. When a slowing up, or total arrest of growth is noticed in the fall, reduce water to once a month on the succulent *Euphorbias*, and keep soil so it will pulverize between the fingers; while on the leafy species keep soil moist.

The following cultural directions are for Southern California where it is possible to grow these plants in the open during the winter months. In selecting a section of your garden to plant *Euphorbias* in, be careful that this is on a gentle slope, this furnishes good drainage, and protects them from the excessive moisture during the rainy months.

Euphorbias will not endure severe frost, and a few, such as *E. grandicornis* and *E. natalensis*, can not live through a slight one; but most com-

mon species such as *E. pseudocactus*, *E. cereiformis* and the *Medusea* group can without injury stand a temperature of twenty-eight above zero if there are no winds. Should your plants receive a frosting,* the damage can be greatly minimized by covering with newspapers or burlap before the sun shines on them as the sudden thawing and warm sun rays are more injurious than the frost to the frozen parts.

*Secretary Willis sprays the plants before the frost has time to melt.—Ed.

FROM ROBERT S. WOODS

Due to a lack of titles, one might gain the impression that the cactus wren photographs which accompanied Mr. Pierce's interesting article were obtained on the Mojave Desert; as a matter of fact, however, they were taken (by the present writer) within the city limits of Azusa, 25 miles east of Los Angeles, where, on the "wash" or detrital cone of the San Gabriel River, the absence of a moisture-retaining soil brings about a condition strikingly parallel in many respects to that caused in other regions by deficient rainfall and excessive heat.

The cactus wrens build some of their nests in the local species of "cholla," *Opuntia parryi*, but since few of these plants are of large stature, many nests are placed in *O. occidentalis*, which is shown in the photographs. Unsited to the wren's use because of their low, spreading habit, two other *Opuntias*, *O. covillei* and *O. vaseyi*, are abundant on the San Gabriel Wash, the last-named opening its lavish display of large, rose-colored blossoms slightly earlier in the spring than the yellow-flowered species. It is also interesting to find here numerous specimens of juniper (*Juniperus californica*), whose nearest kin are across the San Gabriel Mountains to the northward, on the edge of the Mojave Desert.

At the present time the species of *Platyopuntia* in this locality are suffering a severe infestation of the California cochineal scale (*Dactylopius confusus*), which is easily recognized by the white, cottony masses enclosing the small, crimson-bodied insects. The species of *Cylindropuntia* and, apparently, the cultivated spineless cactus seem to be immune to the attacks of the scale, but if a collection is maintained near an infested area, constant vigilance is required to keep many of the flat-jointed cacti free from the pest.

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to accept or refuse
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ASTROPHYTUM MYRIOSTIGMA

By HELEN McCABE

One of the prettiest of all cacti is the plant which is commonly called the Bishops Hood (*Astrophytum myriostigma*) and no collection is complete without it. They are rare, and nicely shaped plants are very scarce, and consequently high-priced. They are of a grayish green color, speckled with minute white specks, and the edges have small punctures as though they were riveted together. The illustration conveys a good idea. It is much sought after by admirers of cactus and highly prized by those who are fortunate enough to possess a good plant.

Foerster's 'Handbuch der Kakteenkunde' gives the history of the plant which I think will be of interest to the readers of the Journal: In 1837, Galleotti discovered on the lime or slate hills of Hazienda de San Lazaro, in a north easterly direction from San Luis de Potosi, Mexico, a fine species of cactus and named it *Cereus callicothe* (from the Greek words pretty and shell or sea star). This species is found, though not commonly, in the oak and pine forests, 2300m.* above the level of the Gulf of Mexico. In their native habitat they may attain a size of six inches.

This species was later on classed with *Echinocactus*, but their peculiar shape, the position of the spine-cushions, (areoles) and the absence of spines, as is the case with many *Opuntias*, which are beset with small glochids, and the most important point of all, that the bloom appeared in the spine cushion, and other reasons led to the conclusion that this was not the proper classification.

Salm Dyck endeavored to hold this species to the *Echinocactus* from the fact that he connected this species with *E. asterias*, but it was finally determined by Lemaire a separate and distinct genus, viz.: *Astrophytum*, from the Greek, star and plant (Star Plant).

This species was first cultivated by Francois Vandermaelen, in Brussels, and bloomed for the first time with Jas. Courant in Havre, year not given.

The body of the plant, when viewed through a magnifying glass, shows it to be covered with tufts of short gray hairs.

They bloom in May, June and July, the flowers appearing at the summit of the stem, nearly always several together; are almost scentless, of



several days duration, opening in the forenoon and closing at night. The flowers are yellow with a deep red center, and make a pretty appearance when in bloom.

The following interesting account of two forms of this plant is from Dr. C. A. Purpus, who knows this species well, and says there are two very different forms. The gray or grayish-white form grows near Torreón, in Cero de la Bola, and in the mountains near Viesca, all in Coahuila. The more greenish lower form is abundant in the Sierra la Tabla, near Guascama or Minas de San Rafael, San Luis Potosi, Mexico. It usually grows in the open mesa among broken stones, but is sometimes associated with other plants, such as *Opuntia leptocaulis*.

The following is the description given in Britton & Rose 'Cactaceae'. Plants solitary or caespitose, globular to cylindric, up to 6 dm. high; ribs usually 5, sometimes 6, 8, or rarely even 10, very broad, acute, usually covered with white woolly scales but sometimes naked; spines wanting, at least on old plants; flowers 4 to 6 cm. long; outer perianth-segments narrow, with brown scarious tips; inner perianth-segments oblong; scales on ovary and flower tube scarious, imbricated, narrow, often bristly tipped, with long wool in their axils.

*Approximately 7,500 feet.

YOUR SECRETARY'S SPINAL COLUMN

By R. E. WILLIS

Our September meeting was held as per schedule at the lovely home of Mr. and Mrs. J. C. Beatty, 15951 Ventura Boulevard, Sunday afternoon, September 29th. Seats were arranged on the lawn facing her cactus garden. Those of you who could not attend the meeting missed a most interesting and instructive lecture given by our fellow member and eminent Horticulturist Mr. Eric Walther, recently from Golden Gate Park, San Francisco. The subject was "Aloes." Only about 100 members were present and as we have some 400 more members who want to know about Aloes, its habits, medicinal qualities, etc., we have prevailed upon Mr. Walther to present this lecture in the Journal. It will appear in the next issue.

Our next meeting will be held in the Los Angeles Public Library, the latter part of this month. An interesting program will be enjoyed by all who can arrange to be present.

The November meeting will be held at the California Botanical Garden of Mrs. Susane Bixby Bryant, Rancho Santa Ana. The date will be announced later.

The plants presented by Mr. Carl Ackerman, 5250 Huntington Drive, were won by Mr. J. A. Ekdom, Pasadena, Mr. John T. Russell, Van Nuys, and Mr. James Kobler, San Francisco.

In spite of the fact that our Exchange Manager, Mr. Bradbury, was not present, the exchange table was well patronized, but a lot of you are overlooking an opportunity to increase your collection by not bringing more and better plants to exchange. Let's make the next meeting a good one on exchanges.

The by-law committee is working diligently on corrections for the by-laws to meet the present status which is really international as we have many members in foreign countries as well as nearly every state in the union.

Our finance committee of the August Show, Mr. F. O. Frazier, Chairman, has turned over to the treasurer a balance of nearly \$750.00 after all bills were paid, so the show was a financial success as well as a success from a popular and scientific standpoint.

The growing season for cactus is about over for this year. You had better begin to slow up on your watering.

Recently a German Man-o-War was anchored off the coast at San Diego. It was interesting to note that nearly every port hole had one or more cactus plants visible. The boat had stopped at various ports along the South American coast. Don't you wish you were a member of the German Navy?

Those of you who did not see the scrapbook that is the pride of Mrs. E. A. Harris of San Antonio, Texas, while she was with us during the show, missed an interesting half hour. It contained pictures, clippings, photos, etc., of cacti and succulents extending over a considerable length of time and was interesting and instructive. I would suggest that we all start one and have them on exhibit at the next show.

I failed to give Mrs. E. T. Stoddard of Whittier, one of our energetic members and collectors, credit for the original of the sketch that appeared on the September meeting announcement. Mrs. Stoddard took the photographic original on a recent trip into Mexico and presented it to me. Also note the following correction: The correct name of the plant shown is according to Miss Kate Sessions of San Diego and Mr. Wm. Hertrich, *Dudleya ingens*. Miss Sessions says that Mr. Rose had a plant sent to him from Lower California and identified it as *Dudleya ingens* and not *Cotyledon pulverulenta*.

Dr. R. Pulleine of Adelaide, South Australia, a collector of cactus and succulents, particularly euphorbias, was a visitor in Los Angeles recently. He called upon several members of the society and subscribed to the Journal. He has written an article for the Journal and we anticipate an illustrated article of his Australian cactus garden in a future issue.

What a real joy to have the words of wisdom of N. E. Brown recorded in our Journal. Had we known that N. E. Brown had done the recasting of the genus *Mesembryanthemum* the work would have had greater weight with us. By us I mean myself and the *succulent* advisers on the staff of the Journal. It was rather misleading that full credit was not given to N. E. Brown in Mrs. Bolus' work on which our statement was based. Hope this last sentence stirs Mrs. Bolus to give us some remarks.

Arthur D. Houghton.

JOURNAL OF THE CACTUS AND SUCCULENT SOCIETY OF AMERICA

A monthly magazine devoted exclusively to Cacti and Succulents for the dissemination of knowledge and the recording of hitherto unpublished data in order that the culture and study of these particular plants may attain the popularity which is justly theirs. "The Cactaceae," by N. L. Britton and J. N. Rose, has been adopted by this Journal for purposes of identification.

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EDITORIAL

By SCOTT E. HASELTON

Four issues of the Journal have now been published, and after more or less experimentation, we believe that we have attained a definite policy for future issues. Thanks are due to our subscribers who have been not only lenient, but very kind in their criticisms and suggestions. We realize how imperfect these first few issues have been and in order to allow more time for those who so willingly check the technical articles, the closing date will be the first day of the month preceding the date of publication. Endeavoring to publish a technical magazine is no small task and the more time that we can allow for checking copy the more accurate it will be.

The editor of the Journal does not necessarily vouch for the accuracy or the authenticity of articles signed by an individual. Except that we try to keep a uniform style and follow Britton and Rose as far as possible, we publish articles "as is" and unless they are contradicted they may be accepted as correct. Good natured discussion and frank opinions will tend to clear up many of the now debatable issues. Thanks to Dr. Houghton for stimulating discussion and to Mr. Weinberg's comments which have already created much interest and letters are pouring in; these will be published as fast as space provides. We are grateful to the men who have sufficient stamina to express their opinions and there is not an individual in the Society who will not welcome other views.

We always appreciate your telling us which articles are most popular and in that way we can give you what you want. Starting with the next issue we will publish a series of articles on Succulents by Eric Walther and we are sure that these will fill the demands of so many who have requested articles on Succulents. We also plan to start a series of articles written by an amateur which will be of real assistance to those who are still wondering how to start naming their plants. Col. Kewen has prepared one of the finest illustrated articles on grafting that we have ever seen. Mr. Frick will get down to business in the next issue and really name all of our Euphorbias (he has kept them secret long enough). We can always depend on Dr. Houghton and enthusiastic James West for real stuff. Dr. Nickerson will no doubt find other enthusiasts who are growing cactus in still more varied conditions—it has been interesting to see how one grows cactus around his home; another under trees or with the help of frames for protection; and then we find Mr. and Mrs. Herbert enjoying their patio cactus garden. Mr. Johansen will furnish an article, "The Chromosomes of *Aloe macracantha*" and we trust that Dr. Houghton and Mr. Hertrich will find these sufficiently technical! Mr. Weinberg promised to tell us what constitutes an amateur, and Mr. Willis is writing an article on "Photographing Pots!"

Will anyone who can take good pictures of plants and their flowers give some of their time to record some of the rare plants? We hear of so many that should be recorded and shared with all the readers of the Journal.

Correction. The Trebal Gardens at 3514 Clarington Ave. (cor. of Stilson), Palms (Los Angeles), does not sell palms but they do specialize in Cacti, Begonias, Ferns and Wigandia.

Mrs. C. F. Besberich, Box 245, Hollister, Calif., would like to buy two Grizzly cacti and two *Ariocarpus fissuratus*.

Otto H. Roller, New Milford, N. J., would like prices on *Cereus flagelliformis cristata*.

A NEWS ITEM FROM CHICAGO

Mr. Hermann Toburch, formerly president of the Freiburg, Germany, Cactus Club, and an authority on Cactus and Succulent plants, is now a resident of this country and wishes all collectors of xerophytes in the vicinity of Chicago, Ill., to get in touch with him at 3406 Fullerton Ave., Chicago, for the purpose of organizing a Cactus and Succulent Society in that city.

Librarian of the Society reports receiving a copy of the Pocket Edition of Cactus Friends, in German, with 24 color plates and 82 illustrations, 210 pages. Sold only through F. F. Schreiber, Essingen and Muenchen, Germany. Price \$1.25.

Fehlerbuch des Kakteenzuechters, is another addition to the library donated by the author, Dr. W. von Roeder. It is in German and is a complete manual, in two parts, of the care, cultivation, and grafting of Cacti. The sale of this book will be taken up by the Journal in the near future.

The readers of the Journal will be glad to know that our President, Dr. Arthur D. Houghton, has been engaged by the old established publishers, Orange-Judd Co., to write a book on "Cactus for Beginners." This is not only a compliment and a recognition of Dr. Houghton's wide experience but the Society and the Journal will gain even more prominence through its association with Dr. Houghton. Ed.



Cacti which stood upon a hillside unwatered for three years except by Nature, demonstrate Mr. Lawrence's argument. These have been numbered to assist in naming some of the more common plants. (See page 95.)

SUGGESTIONS TO AMATEURS

By NED LAWRENCE

Upon receiving one of the questionnaires, "What Are You Going to Do For Your Cactus Magazine?" and "Will You Write an Article?" Ned Lawrence replied, "Maybe." To the question, "Will You Write Your Experience in Growing Cacti?" he replied, "Possibly." That was some time ago. Ned Lawrence was sitting back waiting for inspiration or perhaps taking the position of the spider and the fly. Either way he has been stimulated into writing us a good strong article on "Suggestions to Amateurs Upon Watering of Rooted and Unrooted Specimens in the Garden." As Mr. Lawrence has been collecting cactus for twenty-five years and has about two hundred and fifty plants, besides a number of Agaves, Aloes and other succulents, his advice should be of value to beginners. Perhaps some statements will call forth different opinions from other of the more experienced cactus growers, and these will be interesting to all of us.

Grace Nickerson.

Concluding an edifying article upon the "Best Soil for Cactus," in the August number of the Journal, Mr. Ernest Branton vouchsafes this personal opinion: "I think better success would be attained by the majority of amateurs if more water were used during the hot weather." I have been reading Mr. Branton's articles upon gardening for many years, and have great respect for his opinions generally respecting the care and cultivation of plants, but I fear he has tried to cover too much territory when he ventures into the domain of Cacti, and advocates heavy watering in midsummer. I do not know what his experience may have been, or how much of it he may have had; but I do know that my own experience extending over a period of twenty-four years runs to the contrary.

I have lost more cacti by rot, which is the result of injudicious watering, than ever I have by their drying up. I am not moved to start a controversy with Mr. Branton or any other plant-

lover, but when I discover an article offering bad advice to amateur collectors through the columns of our own society Journal, it seems best to proffer better advice, in order to help our younger amateurs from getting off on the wrong foot. My remarks are addressed to those who are putting their cactus in the ground out of doors, not to any who are keeping small fry in window-pots. Those who are merely fooling around with potted cactus will probably lose them anyway, if not from too much petting and pampering, than from the reverses of neglect and abuse.

Cactus are not meant for house plants, and indoor conditions are poisonous to them. There are a few varieties, Epiphyllum, for instance, which may do fairly well and flower annually in porch or parlor, but the tough, spiny old denizen of the desert is wild, and thrives the better when compelled to fight for its living. Nor am I excepting the succulents from watering in summer time. The Aloes particularly require it, and all of them will keep their color better by watering, although I make the suggestion that shade will do even more for all of them.

Everyone will agree to this maxim, I am sure: If a plant is taken from its native habitat into captivity and cultivation, it will do best when its new and artificial environment is made as nearly like the old natural environment as possible. This goes for all conditions: water, soil, shade, exposure and climate. As when a field explorer comes upon a canyon and finds *Ferocactus* thriving on the side exposed to the morning sun, and not growing so well on the side shaded in the morning and sun-baked in mid-day and afternoon, it needs no argument to tell him to plant his captive where it will face the dawn. Or when one discovers exquisite little *Mammillarias* nestling in the shade of cactus and chapparal, it should be a warning not to expose them to the glare of the noonday sun in any private garden. And so when one brings home an *Opuntia bigelovii* or *Cholla* from the mesas of Southern California, he may be sure that it will be better off without watering except as nature's rainfall nourishes it in the winter.

Many cacti are imported from other states or provinces in Latin-America, where the conditions of climate are the reverse of ours—where the rain fall in the hottest season instead of in the coldest. So, if any such plants are used to heavy drinking in the hottest weather it would be cruelty to deprive them of water in summer. Many *Cereus* are of this class.

But one of the peculiar features distinguishing cactus from other plants is the extraordinary resistance to drouth — their ability to store up

enough juice in their internal reservoirs to carry them over a dry season; and, moreover, the fact that the *chief function of cactus spines is to attract the deposit of dew at night and to conduct it to the areolar sponges which absorb the moisture and refresh the plant.*

It is all well enough to sprinkle any cactus collection, by turning on a fine spray from the garden hose at nightfall, for this serves to wash the dust off the plants and brighten their spines. (Note how the pristine brilliance of fading *Ferocactus* spines returns with light sprinkling). But never cause streams of water to flow into or over a cactus patch. In season or out of season, cactus will not survive if compelled to stand with their feet in the mud.

Amateurs who are just beginning to grow cactus may be interested to know just how to plant slips or cuttings, and what treatment they should receive in contradistinction to plants already rooted. When a cactus has perfect roots it may be put in the ground, as is, with as little disturbance of the earth around the roots as possible, and it should be watered sufficiently then and there to settle the new soil around the roots. Then leave it alone.

When a cactus is rudely torn from its native desert with some roots broken or lacerated, it is best to trim off every wounded root with a sharp knife or pair of shears, let the plant lie in the dark until well dried, and then plant in dry soil.

Turning back the pages of over a score of years of experience, I can point to many fine specimens which I have raised from cuttings. Take any joint of *Opuntia* or arm of *Cereus*, dried so as to be unbleeding, and stick it into a pocket of dry sand made in the garden soil, and it will take root. Don't water it. It will do better if compelled to thrust out roots in search for sustenance.

Everywhere one may observe broken-off joints of parent *Opuntias* which have fallen prone to earth, where the flat slab has curled up as if in death; but if one will take the trouble to lift it, one may find the areoles on the grounded side have put forth rootlets. Leave it be without watering, and eventually fresh new growth will spring from the edge of the old joint. There's a lesson from old Dame Nature herself.

I have made a cactus garden at my home in Highland Park, another on an ideal canyon-side site at Alta Canada, and now that I have been obliged to dismantle the collection because of inquisitive tourists and acquisitive dealers who persisted in visiting it and repeatedly helping themselves to anything less difficult to transport than a hot kitchen stove, I am making a third

garden where it can be policed by as fierce an Airedale as one could wish not to meet. The remnants of my garden at Alta Canada are convincing evidence of the truth that cacti do not need to be watered frequently in summer. I left plants too big to move, and for weeks not a drop of water fell on them—not even the weekly spraying of former years—yet they look fine, healthy, and have been putting on new growth and profusely flowering all summer.

I brought away many slips from my Garden No. 2 and stuck them in dry soil to enlarge the array in my Garden No. 3, and all but one are growing finely above ground and rooting well below. All but one, I said. That one rotted. It got soaked with water intended for an Agave nearby!

This article is straight from the shoulder and Mr. Weinberg has already prepared some valuable comments which will be published in the next issue. Ed.

KEY TO PLANTS IN PHOTO

1. *Trichocereus spachianus*
2. *Opuntia leucotricha*
3. *Opuntia fuscicaulis*
4. *Cereus hexagonus*
5. *Opuntia fulgida*
6. *Opuntia*
7. *O. bigelovii*
8. *O. imbricata*
9. *O. engelmannii*
10. *Ferocactus acanthodes*
11. *Peniocereus greggii*
12. *Opuntia cylindrica*
13. *Pachycereus marginatus*
14. *Myrtillocactus cochal*
15. *Trichocereus spachianus*
16. *Opuntia*
17. *O. basilaris*

MR. AND MRS. W. P. HERBERT'S PATIO GARDEN

By GRACE P. NICKERSON

It has been said of the average life of today—"The material or hard-laboring, hard playing or money-making world—cannot be passed through without leaving its soot upon us. The dirt it lays on our hands is a dirty dirt. Many of us, alas, cannot see that it is there. But the dirt that is upon the gardener's hands is a clean, obvious dirt. It is moreover a cleansing dirt, for it will wash away the soiling of the world, it will scour clean and bright the tarnished hands we bring to it. Gardening then is even more than a way of life; it is a way of salvation. Happy are the people who choose to do their own gardening.

Such has been the experience of Mr. and Mrs. W. P. Herbert who spend much of their leisure time at their picturesque La Casita del Cañón, located near the ocean in beautiful Santa Monica Canyon. Their intention, when building, was to have a little place where they could lead a simple life, where business and social cares could be dropped for a short period now and again. A place with a small plot of ground where they could have the pleasure of producing a beautiful garden as the result of their own toil. They longed for a cessation from the cares and disappointments of a large estate.

La Casita del Cañón is the materialization of their dreams. La Casita del Cañón fairly reeks with romance and personality. The beautiful patio (see illustration on cover) with its colorful furnishings, is the actual living room throughout most of the year. Here is found an unusually large collection of succulents and many cacti which enhances the beauty and interest of the place. Among the cactus and succulent fanciers, whom I have met, I have found none who have a greater pride and keener joy in their plants than the Herberts.

Although at present there seems to be a general taboo on glazed pots for such plants, a large proportion of the Herbert's plants are so potted. I inspected them closely and could not see any indications that they were less healthful than like plants in unglazed pots or in the ground. The combination as to color of pot and plant have been so carefully chosen by the Herberts that the colorful pot seems to enhance the beauty of the plant. As for myself I cannot see any good reason for the objection to glazed pots. Nurserymen successfully grow all kinds of plants in containers which are not more porous than glazed pots. Drainage can be arranged in either case by a plentiful amount of coarse gravel in the bottom of the containers, whether glazed pot or tin. In glazed pots the roots would be less affected by change of temperature in the unnatural climate in which we have chosen to place them, than in the more porous pots. In their natural habitats the roots are shallowly placed; not for the sake of aeration, but so as to be able to quickly gather the limited moisture which falls in these plants. Cultivated cactus need not make such provision.

The Herberts are careful in placing their plants as to sunshine or shade. Placing the sun lovers where they get a plentiful amount of sunshine and the more delicate plants in shaded places.

Among the Herbert plants are found beautiful specimens of *Stapelia variegata cristata*, *Euphorbia lactea cristata*, *Mesembryanthemum simulans*, *Mesembryanthemum musculinum*, *Aeonium tabulaeforme*, *Sedum allantoides*, *Stylophylum hassei*, *Echeveria metallica*, *Tradescantia*, *Sempervivum tectorum*, *Astrophytum myrtilloides*, *Myrtillocactus cochal*, *Cereus peruvianus* and many more of the common cacti and succulents.

TO THE EDITOR

May I be allowed to make a remark or two on the questions brought up by Mr. Weinberg in his letter in last month's issue.

In his criticisms Mr. Weinberg touches on three distinct phases of botanical nomenclature which should be clearly differentiated, to prevent confusion. They may be conveniently illustrated by the species alluded to in the letter, *Ferocactus acanthodes*—*Echinocactus cylindraceus*.

1. *Ferocactus* vs. *Echinocactus*.

This "new name" comes under the head of taxonomy; it is the result of a modification of views as to the constitution of a genus, *i.e.*, Britton and Rose consider the characteristics of the group of species which they sum up as *Ferocacti* (absence of wool on the ovary, etc.) as sufficient to make it generically distinct from that for which they keep Link's name *Echinocactus*. This new name, therefore, is occasioned by the judgment of the authors as to true natural relationships.

2. *Acanthodes* vs. *Cylindraceus*.

This new name comes under the head of priority (or better: strict application of the rules of priority), a very different matter, purely formal, having little to do with the progress of science properly speaking, but rather a clerical matter of files and card-indexes, as it were. A difference of opinion as to how strictly the rules of priority should be applied is of course quite possible; in this very case Schumann in the *Monographia Cactacearum* already admits the undoubted priority of Lemaire's name, but considers it inexpedient to make a change because of the long-established use of Engelmann's name.

3. *Appropriateness of Botanical Names*.

Your correspondent has a number of criticisms to make on this point. Scientifically it is of no particular importance whether a generic or a specific name be accurately descriptive or not; it is simply a handle; a number would do quite as well. A name, no matter how inappropriate, once established by proper publication, has to stand as written and cannot be changed, not even by the author. Even if, hypothetically, *E. acanthodes* had been named, say, *E. inermis*, this would still be its right name, however un-descriptive; even as Mr. Weinberg is Mr. Weinberg to all of us, whether he lives on, or owns, a hillside vineyard or not.

So it will seldom do to draw conclusions as to identity from the name of a plant; all we can do is to make as sure as we can that the plant in question is of the same species as the type-specimen the author based the name on.

Incidentally, I must take issue with Mr. Weinberg's etymology. The first part of the compound word *Ferocactus* is quite obviously not derived from the verb *ferre*, to carry, but from the adjective *ferus*, wild, savage, from which our English word *ferocious* is derived. (Perhaps Mr. Weinberg may gain some consolation from the fact that some etymologists derive *ferus* in its turn from the same root as *fero*, *ferre*, in the sense of "being carried forward" through "impetuous" to "wild.")

As to the word *acanthodes*, this is not Latin, nor has it any connection with either *bear* or *claws*, but is a perfectly good Greek adjective meaning "full of thorns"; which seems appropriate enough.

Mr. Weinberg's objection as to Britton and Rose in the second paragraph of his letter remains to be dealt with. At the head of this Journal appears the statement: "The Cactaceae," by N. L. Britton and J. N. Rose, has been adopted by this Journal for purposes of identification." This is presumably what Mr. Weinberg refers to when he speaks of "the only recognized reference book" (incidentally, he misquotes the title). The statement simply means that, to prevent confusion, it was necessary to adopt, for good or ill, some one authority as standard for our purpose. If our articles and illustrations followed at one time Schumann's system, at another Britton and Rose's or someone else's, confusion would become worse confounded. And it was only fitting that an American publication should follow the latest and only American standard work, which is also the only one at all accessible to the majority of our readers. So the choice would seem justified, if only on practical grounds.

As to the intrinsic merits of the system, differences of opinion are to be expected, and such letters as Mr. Weinberg's are a welcome and valuable aid to discussion.

We hope in a future issue to air our views as to the pro's and con's in greater detail, incidental to a review of Berger's new "Kakteen."

Thanks to such a good cactologist as Mr. Weinberg for opening the discussion.

Yours truly,

JAMES WEST.

Correction. The book which Mr. West lost was not, as stated in the last issue, a pamphlet on *Yucca*, but an unbound volume of A. Berger, "Die Agaven, Beitrage zu einer Monographie" (in German). Mr. West will greatly appreciate if the finder will communicate with him.

THE EXTENT OF RESEARCH OTHER THAN TAXONOMIC UPON THE CACTACEAE

By DR. DONALD A. JOHANSEN, *Stanford University, California*

The existence of gaps in our taxonomical knowledge of the Cactaceae is too well known to require mention, but our lack of knowledge along other lines is appallingly meagre. For instance, we know absolutely nothing of the experimental genetics of any species, and the same is true for the cytological aspects. The latest list of chromosome numbers, published at the beginning of 1926, does not include the Cactaceae, and I am not aware that any numbers have been published since 1925. This particular phase is especially intriguing to the writer, himself primarily a cytologist, for, to judge from earlier studies on other plant families, it will undoubtedly prove the most profitable in useable results of the various studies which might be undertaken.

The literature reveals several morphological studies, the most comprehensive being that of E. d'Hubert, entitled "Recherches sur le sac embryonnaire des plantes grasses," and published in 1896 in *Annales des sciences naturelles, botanique* VIII, 3: 37-128. To give a brief review of this paper: d'Hubert first discusses the mode of insertion of the ovule, finding that there are three distinct modes. Next he takes up the development of the ovule, which is amphitropous and has two integuments. The studies on the development of the embryo sac were based principally upon *Phyllocactus*, supplemented by observations upon various species of *Rhipsalis* and *Cereus*. The embryo sac at the time the egg cell is ready for fertilization is with great reason believed to be uniformly octonucleate throughout the family. D'Hubert's remarks upon fertilization are more physiological than cytological, and he devotes considerably more attention to the role of starch than this subject is nowadays considered to warrant. His drawing are well executed, and indicate the keenest observation.

The species studied were from the genera *Cereus* (5, plus one hybrid), *Echinopsis* (5), *Echinocactus* (1), *Epiphyllum* (2), *Mammillaria* (2), *Opuntia* (5), *Phyllocactus* (4, plus several hybrids), *Rhipsalis* (9)—the taxonomy would, of course, need to be revised in a few instances in accordance with modern conceptions.

From the Cactaceae, d'Hubert proceeds to the Aizoaceae (24 species of *Mesembryanthemum*) and Crassulaceae (13 species of *Sedum*, 6 of *Crassula*, 4 of *Echeveria*, 7 of *Sempervivum*),

but gives very few details. He also investigated superficially the following genera: *Stapelia*, *Hoya*, *Ceropegia*, *Euphorbia*, *Aloe*, etc., and several non-succulents.

The paper is typical of those of its period, though superior in many respects, and consequently should not be evaluated according to modern methods of plant research.

Leon Guignard, the famous French plant morphologist, published some "Observations sur les ovules et al fécondation des Cactés" in the *Bulletin de la Société botanique de France*, 33: 276-280. 1886.

W. F. Ganong, in the *Botanical Gazette*, 25: 221-228, 1898, discussed "Polyembryony and its morphology in *Opuntia vulgaris*." He noticed that from about half the seeds planted, more than one seedling comes up, and further observed that there was the greatest variation in the number, size and degrees of union with one another of these seedlings. He found that the supernumerary embryos originate from nucellar cells, but was not sure if an egg cell is present, which, when or if fertilized, gives rise to a normal embryo. In another paper, read before a society meeting but never published, Ganong described germinated embryos of most of the genera of Cactaceae, discussed their germination and growth, their form-, size- and color-factors, and the features they show of importance for the determination of the phylogeny of the genera; the development of the seedlings, and the unfolding of the peculiar morphological features of the adult plants.

Francis E. Lloyd (*American Journal of Botany* 6: 156-166. 1919) studied "The origin and nature of the mucilage in the cacti and in certain other plants." He describes the distribution of mucilage cells in the plant, their place, time and mode of origin, their chemical structure and inclusions. This paper, as might be expected of this distinguished Canadian botanist, is highly interesting. A somewhat similar study, in which the views of earlier workers are reviewed, is presented by E. Grace Stewart in the *Bulletin of the Torrey Botanical Club* 46: 157-166. 1919: "Mucilage or slime formation in the cacti."

Scattered throughout the literature, both popular and technical, are many notes and observations which, while of a more or less scientific nature, are now principally of historical interest.

In conclusion, mention must be made of the

most interesting and valuable researches of MacDougal and his collaborators, and of Spoehr and Cannon on the cellular physiology of various cacti, principally those which live to a great age. This subject, one fears, is of greater interest to "pure" plant physiologists than to fanciers.

It is almost superfluous to mention that there exists a vast and extraordinarily promising virgin field for scientific research among the various cactaceous genera and in other groups of succulents, such as Euphorbiaceae, Aizoaceae, Crassulaceae, Asclepiadaceae and Liliaceae. The problems are primarily one for the cytologist and secondarily for the morphologist; and from the results and facts secured by these two "species" of botanists, the systematist working along the newer lines of experimental phylogeny in taxonomy, which is proving the most useful of all, can adduce the requisite evidence underlying the interrelationships of the various species, genera and other higher groups.

To visualize what we may expect from a thorough cytological investigation of, say, a single cactaceous genus such as *Rhipsalis* or *Mammillaria*. I might cite the recent work of Martzenitzina, published in an obscure Russian periodical, on *Linum* (the flaxes). He found that the cytological data supported the conclusions of the most competent taxonomists; the genus is no more homogenous cytologically than it is taxonomically. The species differ considerably in the number, size and shape of their chromosomes.

A WORD FROM THE LITTLE GIRL WHO MAILS YOU YOUR JOURNAL

By MARIE ANDERSON

From the very start, the *Journal of the Cactus and Succulent Society*, was received with open arms; our every effort was crowned with success, and we can say, with pride, that no publication so young as our is, can boast of a wider circulation. It travels to Canada, Mexico, Australia, Africa and New Zealand, and from Europe we have subscribers in Holland, Germany, Denmark, Isle of Wright, England and France. One subscriber in Peru writes he is very lonely, as there are no other collectors of succulent plants in that country. Even from far off Japan we have two subscribers and one of them informs us that cacti and succulents are coming into favor in that country.

We have thirty-one public libraries. Nine botanic gardens are listed among those subscribing to this publication, and book dealers in Ger-

many, France, Holland and England take subscriptions and are showing splendid results.

One hundred and ninety subscriptions were received during the month of August and ninety-seven of these were taken at the Cactus show at Pasadena. We are hovering about the five hundred mark, and in number of subscriptions Los Angeles leads with San Francisco next, Pasadena is third and Santa Barbara fourth, we then leave the state of California and San Antonio, Texas, is fifth. The surprise of the entire undertaking was the large number of subscriptions received from the state of Texas. Texans certainly do love their cactus.

Not one cent is spent for the mountains of work connected with the getting out of each issue, all checks being made to three names only, the printer, the engraver and the U. S. post-office. Financially we are sound, and the treasury today assures us fifteen monthly issues for the future, at the present rate of quality and cost—an unusually good showing for a cactus magazine.

OPUNTIA IN AUSTRALIA

(Continued from Page 87)

was a test of seeds of the "spineless" kinds under trial, and proved that all were variants that reverted back to their species in the first generation.

E. O. Orpet.

Along about 1908 a Mr. Eaton of Los Angeles traded a gold mine for the Australian rights to the so-called Burbank spineless cactus. He was in good faith but his selling campaign in Australia was nipped in the bud by an inspector who declared the product worthless. The Burbank spineless cactus was sent to Burbank by a Mr. Foster, proprietor of the Hotel Palacio, Chihuahua, Mexico, at least so he informed me. The editor of the *Century Magazine* might tell us of his research into the matter.

Arthur D. Houghton.

Mail subscriptions and ads to 1800 Marengo St., Los Angeles. Subscription price \$2 per year; foreign \$2.50.

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QUESTION PAGE

By F. WEINBERG

EDITOR'S NOTE: The Journal is fortunate to have Mr. Weinberg conduct this page because of his wide study and experience. Mr. Weinberg received a doctor's degree in a Breslau university and soon after came to America where he has conducted research work for the most prominent botanical gardens both in this country and Europe. Mr. Weinberg's work is founded, not on what others have written, but on his own experiences. He seeks for the truth and fearlessly expresses his views. At present Mr. Weinberg is conducting expeditions and collecting trips and has an interesting collection of rare cactus and succulents, desert animals and reptiles.—Ed.

How can one use Opuntia for grafting stock and where do you place scion on same?

Anywhere you like, but preferably on the top of the ridge or along the edge. Contrary to nursery stock, cactus grafting should only be performed when the stock as well as the scion is in growing condition.

Why are not Euphorbias classified under Cacti?

Euphorbias are a group of plants by themselves, (Euphorbiaceae) of about at least 700 to 1,000 species and found in temperate and tropical regions all over the world. The more succulent and fantastic growing varieties resembling more or less the forms of cactus are found only in the tropics and mountainous desert regions of the Old World. While we miss the cactus-like spines on all Euphorbias they are present in the form of thorns, and some varieties have them over two inches long and more than one-eighth of an inch in diameter at the base. In this group of plants we find them resembling all classes of cactus, not in the form of the spines, but in the cord-like growth like the Rhipsalis, the round and globular shapes like Opuntias and Mammillaria, and others growing like Cereus and gigantic candelabras and trees. Therefore we find them, like other succulents, added by cactus fanciers to their cactus collections. Euphorbias, especially the more succulent varieties, are mostly all natives of the Old World, while cactus are a truly American plant, and being widely different in character and genera, they are not classified with cactus and therefore omitted in books dealing with cactus.

Do plants get most of their moisture from the soil or air?—L. G.

All plants get their moisture through their root system, and excess moisture is given off through evaporation by the leaves, as in the case of annuals, biennials, deciduous shrubs and trees. Others, again, as in the case of cactus and

yucca-like plants, store the water in large tuberous roots, or body, trunk, or base during the rainy season and use it up during the periods of drought.

What is there to the theory that potted plants thrive better when in direct contact with the ground due to "magnetic contact"?—S. E. H.

Never heard of plants having "magnetic contact" any more than any kind of metal or mineral, except iron and steel. Most all plants have two systems of roots. One of them goes straight down from the center of the plant and is called the "tap root" and has no other function than to act as an anchor to hold the large and upright growing varieties straight in place. The other roots which are formed are more or less hair-like, growing in all directions sideways and downwards, sometimes to the extent of twenty or more feet, in search for moisture and nourishment. These roots are called the "feeders." Now, a plant being potted, sending out these feeding roots in all directions for moisture and nourishment, comes in a short time in contact with the sides of the pot. The pot being porous and standing in the dry air on a board or shelf is always absorbing moisture and nourishment, the sides of the pot take the moisture out of those feeding roots and dry them up, consequently the plant is hampered in its growth and becomes sickly. On the other hand, the pot standing on the ground will hold and absorb most of the moisture from below, therefore, the pot being moist, and the pores filled up with moisture, those fine feeding roots instead of drying up and dying, have a better chance to fill the pot, give the nourishment necessary for the plant, and therefore produce a better looking, well growing and healthier plant.

Can Phyllocactus be grown as successfully in the open as in a greenhouse?

Not very well if they are on their own roots, except perhaps in a warm, shady, sheltered and draughtless position against the side of a house or inside of a lath house.

Plant material for identification may be sent direct to 120 N. Gates St., Los Angeles, Calif. Inquiries and questions which may need an immediate answer must be accompanied by stamp or self addressed stamped envelope.

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